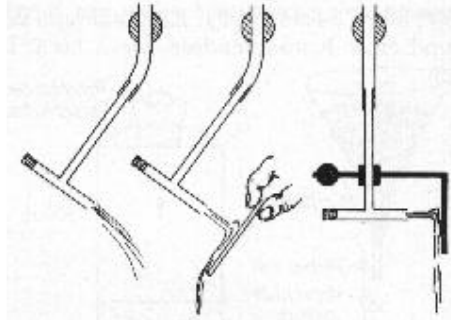


# Recoil of a water-jet

Aim: To show an example of Newton's third law.

Subjects: 1H10 (Action and Reaction)  
1N22 (Rockets)

Diagram:



- Equipment:
- T-tube,  $\varnothing$  10
  - rubber hose (about 2 meters)
  - faucet
  - tray to catch the water

# Recoil of a water-jet

Presentation: The rubber hose with T-tube hangs vertically down. Opening the faucet makes the T-tube move away.



When a plate is held in the water-jet nothing changes.

When the plate is fixed to the T-tube the hose stays vertically in its position.

Explanation: In order to convert a downward waterflow into a sideways waterflow, the T-tube has to exert a force on the water. The reaction to this force is responsible for the recoil to the other side.

When a plate is placed in the outcoming waterstream, it also exerts a force on the plate. When this plate is fixed to the T-tube, these two forces cancel, so there is no recoil

Remarks: This demonstration can be performed by the students themselves, by giving each of them a flexible soda straw, giving it a 90° bend (Figure 1).

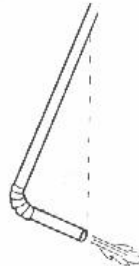


Figure 1

Blowing hard in the long part of the straw, the free end recoils. The no-recoil can be observed when a small plastic bag is attached at the end of the straw.

- Sources:
- [Friedrich, Artur, Handbuch der experimentellen Schulphysik, part 2, Mechanik der festen Körper](#), pag. 169
  - [Ehrlich, R., Why Toast Lands Jelly-Side Down: Zen and the Art of Physics Demonstrations](#), pag. 34
  - [Ehrlich, Robert, Turning the World Inside Out and 174 Other Simple Physics Demonstrations](#), pag. 35